Flame retardant chemicals in consumer products

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MISSION STATEMENT
To safeguard the Earth: its people, its plants and animals and the natural systems on which all life depends.
Toxic chemicals in our everyday products: flame retardants

- Flame retardants: what, why and where?
- Adverse health and environmental impacts
- Flame retardants and fire safety
What are flame retardant chemicals?

- Chemicals added to products to meet flammability standards
- Goal is to prevent, slow fires
- Used in products since the 1970’s
- Many associated with health, environmental impacts
- Effectiveness questionable
Flame retardants used to meet Technical Bulletin 117 (TB117) standard

1975 California standard for furniture, juvenile products

Test of filling inside products

Flame retardants added to pass the test
TB117 label on products

NOTICE
THIS ARTICLE MEETS ALL FLAMMABILITY REQUIREMENTS OF CALIFORNIA BUREAU OF HOME FURNISHINGS TECHNICAL BULLETIN 117. CARE SHOULD BE EXERCISED NEAR OPEN FLAME OR WITH BURNING CIGARETTES.
Tracking the effects of flame retardants

Environmental sources

Exposure pathways

Biomonitoring human exposure

Toxicology Animal studies

Adverse health effects
PBDE flame retardants used in wide variety of products since 1970’s

PolyBrominated Diphenyl Ethers

Foam inside furniture, baby products

Electronics cases

Textiles
PBDE flame retardant levels rising in people

Sjodin 2004; EPA PBDE Biomonitoring Report 2012

97% of samples contained PBDEs

PBDEs in blood, breast milk, fat tissue

2004

Collection year

Concentration (ng/g lipid)
HOW DO FLAME RETARDANTS GET INTO PEOPLE?

What are the exposure pathways?
Flame retardants continuously migrate out of products

1. Not chemically bonded to plastic materials
2. Chemicals off-gas
   Attach to particles in air
3. Contaminated particles settle in house dust
Flame retardants enter people’s bodies in contaminated dust

Frederiksen 2009
Young children are vulnerable to chemical exposures from dust

Mothers 1.5-4 year olds

Sum of PBDEs, median value (ng/g lw)

Lunder 2010; Bradman 2012
Adverse health effects of PBDEs: animal studies

• Endocrine disruption: thyroid hormones
• Affect brain development
• Affect reproductive development and fertility
• Affect immune function
• Cancer
High PBDE levels associated with:
- Lower birth weight
- Impaired attention
- Poorer coordination
- Lowered IQ
- Longer time to get pregnant
- Altered thyroid hormones
- Hormone changes
- Decreased sperm quality, testis size

PBDEs are the “new lead”
Tracking the effects of flame retardants

Environmental sources

Exposure pathways

Biomonitoring human exposure

Toxicology Animal studies

Adverse health effects
PBDEs banned, phased out of use

Persistent  
Bioaccumulative  
Toxic

These are properties of Persistent Organic Pollutants:
- Considered unmanageable risks
- Once on planet, will be with us a very long time
- Spread cannot be controlled

A few official Persistent Organic Pollutants:
- PBDEs
- DDT
- PCBs
CAN WE REPLACE PBDES WITH SAFER FLAME RETARDANTS?
Toxic whack-a-mole: moving from one similar chemical to another

Furniture, baby products
PBDEs

TOXIC

Furniture, baby products
Chlorinated Tris

CARCINOGEN

Furniture, baby products
Firemaster 550

OBESITY, ANXIETY?
Young children have higher levels of replacement flame retardants in their bodies.
Babies and toddlers: replacement flame retardant exposures from dust and baby products

Butt 2014; Hoffman 2015
Replacement flame retardants are global contaminants
IS IT NECESSARY TO USE FLAME RETARDANT CHEMICALS IN OUR EVERYDAY PRODUCTS?
Flame retardants used to meet Technical Bulletin 117 (TB117) flammability standard.

1975 California standard for furniture, juvenile products.

Image: A notice stating, "This article meets all flammability requirements of California Bureau of Home Furnishings Technical Bulletin 117. Care should be exercised near open flame or with burning cigarettes."

- Test of filling inside products.
- Flame retardants added to pass the test.
Flame retardants in filling are not effective

Do not prevent fires or decrease fire hazard

no flame retardants  with flame retardants

“Worst of both worlds”

Babrauskas 1983; Talley 1995; Mehta 2012
Flame retardant industry deceptive tactics exposed
THANK YOU!